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Art. I.—*Monography of the Genus Camellia, or An Essay on its Culture, Description and Classification.*

(Continued from page 175.)

Section 3. — *Irrigation, and the kind of water most proper for that operation.*

It is a principle in horticulture, that exotic plants, with persistent leaves, and which, in our green-houses are in almost a constant and more or less active state of vegetation, according to the temperature of the air, require, even in winter, a certain degree of humidity, sufficient to afford aliment to the leaves and roots. This is not the case with exotic plants, which have caducous leaves; these plants during the time they are in repose, scarcely require any water. The Camellia being a plant with persistent leaves, likes almost a constant humidity, and especially in summer. Frequent waterings, during the hot season, powerfully contribute, to reanimate and sustain its beautiful appearance. But the second effort of vegetation having terminated, when the new wood is almost matured, which is generally the case by the middle of August, and the buds are formed then, until the period of the next florescence, the distribution of water becomes difficult and requires great attention; for the health of the plant chiefly depends upon the care with which this is done. Too little, or not enough humidity, has the like injurious effects. The roots either become dry or rot, the whole plant languishes, the leaves, buds and flowers fall off, and finally it dies. The first consideration then, is the knowledge of adopting the

proper mean between humidity and dryness, especially during the period that the Camellia remains in the green-house.

But what then, is this proper mean which is most congenial to the Camellia? What is the quantity of water which it requires? At what hour of the day should it be given? What kind of water is best? All these questions are of great importance, but easily resolved. We have said that, generally, the Camellia likes almost a constant humidity; but still there should not be given, a great quantity of water at a time; it is only essential to repeat the watering often, in order to keep the earth always in that state of humidity, which is sufficient to maintain the fermentation, but by no means so great, as to prevent it; which would inevitably be the case, if the water is too copiously supplied. As to the hours of the day, which are the most favorable for watering the Camellia, we can only say, they must depend on the seasons, and especially on the temperature of the external air. In the winter, whether the pale and feeble rays of the sun appear to gladden the sad and dreary aspect of nature, or that she is long deprived of them, as is most common, it is necessary during those short and cold days, to water this plant, between nine and ten o'clock in the morning, in order that the earth may have time to regain its heat, by permitting the evaporation of a portion of its humidity. If the Camellia is watered in the evening, the coolness of the night joined to that of the water, arrests the progress of the sap, and there being no evaporation, the fall of the buds is the inevitable consequence of such an untimely operation. In the summer, on the contrary, when the Camellia is in the open air, it should be watered in the evening, because the water contributes to maintain the coolness of the earth during the night, and the plant bathed in this congenial humidity, recovers from the absorbing effects of the ardent heat of the day.

It is not sufficient, however, to moisten the roots of the Camellia When the temperature of the green-house rises too high, which often happens, during the months of May and June,—for our advice is, to leave the Camellia in the green-house until the end of June,—the leaves of this plant require, that the salutary humidity in which they delight, should be given to them at that time, when they are exposed, in the shade to the open air. A syringe or hand pump is made use of, to cause the water to fall upon the leaves of

the Camellia in fine drops like a gentle shower of rain. The water should be of a medium temperature. This mode of watering, which is so beneficial to the Camellia, when it is in the green-house, in the latter part of the spring, is still more so, if it is frequently done in summer, when this shrub is exposed to the open air. We think it also very beneficial at this time to water the surrounding ground on which the plants stand, to restore to the air, a part of its elasticity, and to the plants those vapors from which they derive their ærial nutriment.

But although the waterings properly attended to, have a favorable effect on the vigor of the Camellia, yet if they are too long neglected, the contrary result is produced from the aridity of the earth in the pots, which is the consequence of such omissions. A too great dryness of the earth, attacks this shrub in its roots, and when that is the case, there are no means of arresting the evil. Peat earth, on becoming dry, is incapable of absorbing water, or if it permits its passage, it is only in the form of an infiltration, and does not take place except when the water meets no obstacle and passes through the pot, without refreshing the roots of the perishing plant. The Camellia, when the waterings have been long neglected, does not exhibit any symptoms of suffering, but is soon despoiled of its leaves; the wood becomes shrivelled and stunted, the buds fall off, and death speedily follows.

To restore the Camellia to life, when this evil is not incurable, it is necessary immediately to repot it, giving to it fresh earth, cutting it down short, and placing it under glass in a hot-bed, moderately hot, depriving it of the air and sun, and watering it very moderately and only by degrees; above all, do not soak the plant, with the ball of earth on it, in water, as is the practice with some gardeners; this sudden transition is very injurious, and will complete that destruction which the dryness of the earth had commenced. Another mode of saving the plant, is to put it in the open ground, under the protection of glass, where it more promptly acquires its primitive vigor.

The waters of fountains and wells, when they are selenitical or calcarious, and even those of rivers, as they are often charged in their course with various salts, are all injurious to the vegetation of the Camellia; and if any of them are used, they should previously remain exposed to the action of the sun for at least twentyfour hours.

hours. Rain water is preferable, and has a salutary influence on the health of the Camellia. Not being saturated with any of the saline principles, possesses the property of easily dissolving those salts which are contained in the earth in which the plant is placed, and are of the character which penetrate its tissue.

But the best waters for the camellia, are those of swamps, morasses and bogs, which have been continually exposed to the influence of the sun and air. These waters containing, in abundance, the principles of nutrition, especially when they are found mixed with the detritus of vegetable and animal bodies, which furnish a certain quantity of carbon and azote, act in a wonderful manner upon the voracious organs of the Camellia ; but these waters should only be employed in the summer, when the shrub is exposed to the open air. In winter, and when the plants are in the green-house, they should be moistened with pure water, which has remained for several days in a cistern, situated in a corner of the green-house.

SECTION 4.— *The removal of the Camellia from the green-house into the open air.*

The period of removing the Camellia from, and returning it to the green-house, as well as the exposition, which is given to it, during the summer, have a great influence on the health of the plant in winter. From the experience of several years, we have ascertained that the period when it should be removed from the green-house, is that, when it has completely finished its first growth,— when the new wood is ripe, and when the buds have all appeared, which generally arrives at the end of June. The Camellia does not like the full influence of the sun's rays, but on the contrary is pleased with a shady position and a free circulation of air. A northern exposure, where the first beams of the rising sun fall upon it, is the most eligible. If placed in a sunny position the buds are too rapidly formed, and the florescence is less beautiful, even if they are complete in their development. The same precaution is to be observed in removing the Camellia from the green-house, as with all other plants, which are there cultivated. The most important, is a shady and airy position ; the most congenial kind of protection from the sun is a live hedge or a range of cedars, (Thuya orientalis or Arbor vitæ,) placed from eight to ten feet apart. The latter have the advantage of offering, by their evergreen foliage, the most desi-

rable kind of protection, and have also a beautiful appearance, as by proper management, they can be made to form a sufficiently compact screen. With such a protected position, neither the injurious effects of the violence of the sun's rays, the winds, rain storms, or even the ravages of frost are to be feared.

We are in the habit of allowing to the Camellia, the advantages of such an exposition, until the end of August. Early in September, this plant should be exposed to the influence of the sun, during a greater portion of the morning, and even until near noon, and be so left, until it is returned to the green-house. This warm exposure confirms the last efforts of vegetation, consolidates the buds, and thus insures to the cultivator the pleasure he anticipated, as the reward for all the cares he had bestowed, on this admired plant.

The restoration of the Camellia to the green-house.— The heavy rains of autumn, which are cold and frequent, enervate the Camellia, and always render the success of a complete and satisfactory florescence doubtful. The plants should, therefore, be restored to the green-house as soon as the rainy season commences, and especially, as the nights become cold, although the days may still be warm, for this remarkable difference of temperature, is injurious to the shrubs and should, therefore, induce the amateur to restore them early in October, or later if the season is mild; and he should always select the most pleasant day, for this operation.

SECTION 5.— *The proper kind of green-house for the Camellia.*

The Camellia being a rustic shrub, it prospers sufficiently well in all kinds of green-houses; but to render its florescence abundant and beautiful, it should be kept in a medium temperature, and placed, as near as possible to the light. Those plants which possess great vigor, and are from six to seven feet in height, flourish every where, if they are not checked, by accidental circumstances, as is frequently the case, with those, which have a lower exposition. But the young plants, which have recently been produced by grafting, or which are not more than a foot high, as well as all the delicate and rare species, require a brilliant light to bloom well. It is true, that such a position offers serious inconveniences, and among others, a stroke of the sun in the spring, which at any moment may scorch and injure the health of the plants. But these accidents can be prevented, by extending daily, about eight or nine o'clock in the morning,

cloths over the glass and withdrawing them, as soon as the sun disappears from the green-house.

The double roofed green-houses, which are called *English* or *Chinese*, are excellent for small Camellias; but they do not present an agreeable appearance; still it is well to have one of them, to make the Camellia flourish, until the period it comes into flower, when it can be removed to the large green-houses.

The green-house for the Camellia should be furnished, like all others, with a stove or furnace, well built of masonry, the funnel of which should be of brick and of a square form, placed in the interior, against one of the walls;— that in front is most usually selected for the purpose. The entrance to the furnace should be on the outside, so that the fire can be attended to, without entering the green-house. This precaution is very necessary to prevent the smoke from being admitted, as its injurious influence is irreparable; the fall of the leaves and buds being the immediate consequences.

The confined heat of the green-house produces a vapor, which attaches itself to the ceiling, glass and walls, where it is condensed and falls in drops upon the plants. This concentrated vapor, is injurious to the Camellias which receive it, if they are suffered thus to remain, for any considerable time. In order to promptly remove it, it is useful, when the exterior atmosphere will permit, to open some of the sashes, and kindle, at the same time, a fire in the furnace, to temper the fresh admitted air. If this mode is impracticable, in consequence of the intensity of the cold, it must be attempted to remove the moisture, where it is collected on the glass, by the use of cloths, fastened to a staff. When it is necessary to keep up the fire for a long time, on account of the cold, it must not be forgotten to water the Camellias, which are near the furnace and funnel, and even all the others, if it is requisite; for if the earth becomes too dry, it causes, as we have experienced, irreparable disasters.

SECTION 6.— *The ventilation and temperature of green-houses.*

The air being one of the most indispensable elements, to the prosperous condition of plants, it is requisite that it be temperate and circulate freely in the green-house. An active, dry and cold air is injurious to the Camellia; while a humid and warm air is favorable to its vegetation. A thermometer, therefore, should be placed in the green-house to regulate its temperature; and although

the Camellia may be exposed to some degrees of cold, without suffering; still to render its florescence certain and perfect, it is necessary that it should enjoy a temperature, of from 45 to 50 degrees of Fahrenheit's thermometer.

As long as the exterior atmosphere, is near those degrees,—which should be indicated by a good thermometer exposed to the north in the garden, the doors and sashes of the green-house may be left open; but they should be carefully watched and shut as soon as the external temperature descends to only ten or twelve degrees above the point of congelation.

It is useful to give air to the Camellias every morning, even when the weather is a little cold, if the sun is bright above the horizon. As the leaves of the Camellia, present quite a large, shining, porous and slightly humid surface, they attract the dust, which is continually circulating in the green-house, and soon become covered with it. These foreign bodies prevent the exercise of their absorbent functions, or rather, obstruct the pores, which are destined to inspire the surrounding nutritious gases, as well as to expire those which are disengaged from the plant. It is therefore necessary, that from time to time, during the winter, this dust should be removed from the plants. The following are the modes of doing it.

Some persons wash the leaves with a piece of sponge; but while the sponge, if it is not continually cleansed, absorbs the dust of the leaves, and communicates it to those to which it is successively applied, it also leaves a little humidity on them, which immediately collects the dust again.

The best method is, to use a small piece of fine and dry linen, or cotton cloth with which the leaves are to be lightly and carefully rubbed; they immediately acquire all their natural lustre and present a renewed appearance of health and vigor.

While the Camellia is in the green-house, and even when in the open air, a kind of moss, which is often produced by the quality of the water used in irrigation, is formed, which covers the superior surface of the earth in the pots. It is, therefore, necessary, when the plants are removed from, or restored to the green-house, that this moss should be carefully taken off, and with it as much of the earth as possible, which is to be replaced, with such, as has been prepared, for the purpose, in the manner, that has been described, and which has a vivifying effect on the plants.

SECTION 7.— *The insects which are injurious to the Camellia.*

The Camellia is attacked, both, when in the green-house, and exposed to the open air, by several small insects, which are the *aphides*, (plant lice,) *formicæ*, (ants,) *kermes*, (a small beetle of the coccus genus,) *cochineal*, (also a beetle of the coccus genus,) &c.

It is not an easy task to destroy these various kinds of insects, and the process we shall describe requires great care and attention.

The Aphides are developed early in the spring; they attach themselves to the most tender shoots, and cover them so completely, that the bark seems to have changed its color; and are constantly pumping the abundant sap, with which the young branches are filled, and they consequently languish. The leaves fade and soon perish, if the insects are not either removed by the cultivator, rains or certain winds which are fatal to them. They are readily destroyed by burning tobacco in the green-house, washing the infected branches with soap suds, or, what is still better, crushing them with the fingers.

Although it is said, that the formicæ live at the expense of the aphides, we believe there are some of the species, which are nourished by the tender twigs of the Camellia; besides, their numerous progeny is very inconvenient, especially when they form their habitations, as is sometimes the case, in the Camellia pots. Green-houses can be readily cleared of these insects, by partly filling small phials with honey and water, which they are thus induced to enter, in vast numbers, where they are drowned.

The Kermes,— commonly called the orange-bug, which is often seen on the leaves and bark of the young branches, and the cochineal, which attaches itself to the new shoots, and in the axils of the young leaves, draw out all the sap. These enemies are to be destroyed, by visiting the Camellia often, early in the morning, and crushing them with a small flat piece of wood.

Earth worms, easily enter the pots, disturb the roots and decompose the compost. The method of preventing them from entering the pots consists, in placing a piece of slate under each, supporting them on planks, or making a bed of fine gravel, or river sand, two or three inches thick, on which they are to stand.

When these worms are in the ball of earth, which surrounds the roots, and they cannot be extirpated, by removing it from the pot,

they may be compelled to leave it, by watering once or twice the roots with a slight decoction of tobacco. We have employed, with success, a very slight solution of quick lime: but this method, if it is not performed with great precaution, will completely destroy the most delicate roots, when the plant inevitably perishes.

SECTION 8.— *Florescence of the Camellia and manner of forcing it.*

The natural epoch of the florescence of the Camellia is, generally, from the month of December, until the end of March. Still, by an artificial culture, to which it readily yields, if it is desired to calculate the phases of its vegetation and follow its progress, plants may be made to bloom, in succession, from the commencement of September, to the end of April. The best course to be pursued, to insure success, in this extra-natural culture, is as follows.

When it is desired, that a plant should bloom in September, its vegetation should be excited, at least a month earlier than common. For this purpose, in the month of February, the plants, which have not any flower bud, and which are in a vigorous and sufficiently forward condition, should be selected and repotted, in the manner which has been described, if it is necessary, and then placed in a position, where the heat can be augmented, in order that they may by this artificial means commence vegetation promptly and finish their first growth, a month sooner than usual. They are to be removed from the green-house, by the end of May, instead of the close of June and placed in a less shady exposition, than is the general custom.

In April, the plants which give indications of blooming, should be retained in a green-house, which must be ventilated, during the day, but closed at night; and they must be protected, against the solar rays, by means of cloths, or light mats, and kept in a uniformly temperate and equal atmosphere. In proportion as the exterior air diminishes in temperature, that within must be elevated. By this mode of culture, if it is well conducted, abundant and beautiful flowers will be obtained, in the month of September. Besides those plants, which are ready to bloom, may be placed toward the end of this month, in a hot bed which is kept moderately warm,— care being taken to screen them from the sun, and give them air in the day time, and they will continue to bloom in succession.

When it is desirable to retard the florescence of the Camellia, all

the operations which have been described, are but to be performed a month later, to make them bloom naturally; and by the means of a less elevated artificial atmosphere, but which, however, is constantly equal, the development of the flowers may be retarded for several weeks.

SECTION 9.— *Means of preventing the buds from falling off.*

To prevent the fall of the buds,— a natural desire of the horticulturists—and induce the Camellia to bloom abundantly every year, it is necessary to attend constantly and in the most faithful manner to its culture, especially from the time of repotting, to the development of the flowers. We shall not repeat, what has been said upon repotting, but add: first, that it is indispensable, immediately after that operation, to keep the Camellia in a temperature, of from 58 to 65 degrees, during the day, and from 54 to 58 in the night; second, that as soon as the young shoots have terminated their development, during which they are still in a herbaceous state, it is requisite to increase the heat of the green-house from 68 to 77 degrees during the day, and from 58 to 65 in the night. This augmentation of temperature, causes the buds to appear more readily, in greater abundance, and more vigorous. We have observed, that if nature is not aided, at this period, by an increase of heat, the new shoots, being left in a too low temperature, are suddenly checked and become hardened, before their natural maturity is completed. In this conjuncture, the development of the buds becomes more difficult, in consequence of the hardness of the wood, and is not effected until a later period; they are often, from this cause, less numerous, and very imperfect; and besides, they fall off, on the first change of temperature. It is probable, that this fatal accident is in consequence of their no longer receiving that lacteous nourishment, from the herbaceous shoots which contributes so powerfully to produce, and firmly attach them to the branch, which they are destined to embellish, at a later period.

When the buds are perfectly formed,— which is, as has been said, in about three weeks after the first effort of the plant to throw out new shoots— care must be taken, to diminish, gradually, the heat of the green-house, until the period, when the Camellias are removed into the open air; which is usually towards the end of June.

Finally, being placed in its summer exposition, the Camellia

demands the strictest observance, of all those directions, which were given in the fifth section.

But those directions, however well attended to, will not prevent the fall of the buds, if it is neglected to keep the plant in *a uniformly equal temperature*, of between 47 and 50 degrees during the day, and 43 and 45 in the night, from the first of October, until the end of March. We designedly insist upon the necessity of a strict attention to this uniformly equal temperature, because, that in fact, whether the Camellia is kept, during the rigorous season, in a constant temperature of but from four to six degrees above the freezing point of 32, by only permitting the heat to be augmented by the exterior atmosphere; or whether the temperature of the green-house is always maintained up to between 54 and 60, this double difference, remaining constantly the same, cannot in either case be injurious to the florescence. In the first it will be only later and in the second more precocious; but if, in the last hypothesis, the artificial heat, is, for even a short period, too violent, in consequence of the furnace being badly managed, the plant will bloom well, it is true, but, not having enjoyed a constantly uniform temperature, in the green-house, up to the usual period of its removal, it languishes, loses its leaves, and often, it is not in the power of the horticulturist, to prevent it from perishing. Such is the fate of the forced Camellia, which are destined to decorate our saloons in winter, and furnish the tribute of their brilliant flowers, during the season of magnificent entertainments.

An equality of temperature is therefore, essential, for the preservation of the buds. A too sudden change, whether it arise from the momentary introduction of cold air into the green-house, at the time when the heat is up to from 54 to 60 degrees, or from a too great elevation of the temperature, to from 60 to 65, too suddenly introduced, when the thermometer, indicates but 32 degrees; both of these sudden and violent transitions produce the same results,—the fall of the buds: the reason appears to us evident.

When the buds are near expanding into blossom, a mild and continued heat causes them to advance rapidly, the vegetation of the Camellia, being then confined to only this part of the plant. If then, to an excessive elevation of the atmosphere, there succeeds a considerable reduction of the heat, the sap, operated upon by this sudden change, is checked; the buds no longer receiving nourishment, as abundantly as before, they become dry and fall.

A physiologist cannot fail to notice, with deep interest, how powerfully the heat and cold, instantaneously acts, upon the buds, when they have reached a certain degree of development. The slightest difference of temperature affects them considerably.

The necessity then, cannot be too earnestly insisted upon, of keeping the heat of the green-house, at all times very near the same degree of elevation. In the spring, this regularity is less necessary, because there is nothing to be feared from such sudden transitions, and the solar heat is daily increasing; but, in winter, the atmospheric variations, being so frequent and instantaneous, and the life of the plants being confided to artificial means, it can be easily conceived, that much greater vigilance is necessary to regulate, according to the circumstances, the temperature which they require.

To act in conformity to these established principles, it is necessary to have two thermometers in the green-house, one being placed on the rear and the other on the front wall, and to examine them attentively several times every day. When the temperature falls as low as 38, the doors and sashes should be immediately closed; and if, notwithstanding this precaution, the thermometer does not indicate a proper heat, a little fire must be kindled in the furnace; but care must be observed not to elevate the temperature either too suddenly, or too high; from 38 to 41 degrees of constant heat is better than 54 which is irregular and interrupted. We do not open our doors, only when the exterior air is of a congenial temperature, or when the sun shines on the superior sashes of the green-house, and the interior heat has arisen to from 50 to 54 degrees. It should be recollected, that this plant is like a watch, which requires to be daily wound up, by a regular process and not at various times and by jerks.

We have seen the buds fall, within fortyeight hours from a hundred beautiful Camellias, which were enclosed in a green-house, in consequence of the temperature of 60 degrees, to which the plants had been accustomed for many days, having been allowed to fall as low as 38. It can readily be conceived, that such an extraordinary change of temperature, should disorganize the ascending progress of the sap, and cause the most fatal consequences.

Finally, to prevent the buds from falling, there is still another very simple method, which was made known to us, by the late M. Cels, and which we have practised often with success. It consists

in placing the Camellia filled with buds, upon a moderately warm hot bed, four feet broad and three feet in depth, covered with a glazed sash, and put in fermentation by fresh horse manure, or dry leaves, well pressed down. The manure should be put in the interior of the bed for the evaporation produced by these confined substances, is injurious to the florescence. The Camellias when placed in this hot bed, are managed in the same manner, as those in the green-house; that is, giving them air, whenever the exterior temperature will permit, and covering them with mats during the night; if it freezes, the coverings are doubled and kept on until there is a change to mild weather. The air is then gradually admitted and they are moderately watered. In relation to this subject we can relate a sufficiently curious fact.

We saw, in the rigorous winter of 1829 and 1830, M. Cels, confine, under the sashes of a hot bed, which were covered with mats and straw, the most beautiful white and striped Camellias in full bud, and leave them thus deprived of air and light, during the whole winter, and when the hot bed was opened, although the humidity poured out in clouds and seemed to drown the plants, nearly all the buds were uninjured, perfectly fresh, well nourished, and some of them beginning to bloom, and all of them in a few days were admirably developed.

It is here proper to mention some varieties of the Camellia, whose buds expaud into blossom with difficulty and but very rarely, in consequence of the multiplicity of the petals, which are contained in them: they are the Camellia *Dorsetti*, *Woodsii*, *gigantea*, *Chandlerii*, *Rex Georgius*, *Florida*, *&c.*

The buds of these plants often only half open, and sometimes even less; they remain in this state for several days, and finally drop off.

If these buds are opened after their fall, a certain quantity of water is found collected in their calyx, and their central petals in a state of decomposition. To this stagnant humidity it is most probable may be attributed, the destruction of the vegetable energy of the short peduncle which sustains the bud, and whose putrefaction occasions its fall.

This examination has induced us to attempt a particular mode of obtaining a regular florescence of these varieties of the Camellia; and the experiment having succeeded two years in succession, it is

now made known for the benefit of amateurs. We placed, during the winter, several of these varieties, and especially the *Woodsii* and *Dorsetti*, in a very airy, light, dry and sufficiently cool situation; the number of buds were reduced, that there might be more sap and vigor for those which remained; the plants were kept in a low temperature, for the purpose of retarding the growth and development of the buds, until the season of pleasant weather was so far advanced, as that the natural heat of the atmosphere became both more equal and active. At the close of the winter, these Camellias were removed into the green-house and placed in the most favorable position, where they were watered frequently, but only a littte moisture was furnished at a time. In the spring, all these plants developed their buds easily, and presented a magnificent florescence. We invite all amateurs to repeat this experiment and request them to inform us of the result.

SECTION 10. — *The management of Camellias in private apartments.*

The Camellia is such a pleasing and elegant plant, that every one is desirous of decorating their saloons with it: but these positions being too warm and nnhealthy, the vital principle of its organization is deteriorated, and it soon perishes.

We have thought, however, that this flower might be enjoyed for a long time, in private apartments, if it could be isolated from the influence of the fire and the mephitic exhalations of the human body, by the means of glass. Place, for example, some shelves, like steps, against one of the walls of the room, on which may be stood pots containing several varieties of the Camellia in bloom, and, enclose these steps in a glazed frame. The plants would not suffer in such a secure position, and the flowers would have a most interesting and pleasing effect. Attention will be requisite, to give them air, in the morning, before the fires are made in the room; and when the florescence has ceased, they should be replaced in a green-house or what is still better, in a glazed hot bed.

Camellias in bloom, might be enclosed between double windows prepared for that purpose, when the thickness of the walls of the house is such as to allow sufficient space; and if the aspect is a southern one so much the better. The flowers and the verdure would be very brilliant in such an exposition, as they would be

completely protected from the dust, and besides the plant could not be injured by its removal from the green-house into a habitation so favorably situated, for the complete preservation of its health.

SECTION 11. — *The cultivation of the Camellia in unconfined earth.*

The Camellia, when placed in unconfined earth, whether in a conservatory, green-house or a hot bed, grows rapidly and in a few years becomes very much extended, and blooms easily and abundantly; but if attention is not paid to having a proper drainage, to allow the water to pass off from the roots, or if it is entirely deprived of the contact of the open air,—especially in summer, the earth in which it is planted, is deteriorated, the roots putrefy, the plant is stripped of its leaves, and perishes.

To avoid this sad result of negligence, it is essential, before transplanting the Camellia into unconfined earth, to prepare the soil where it is to stand, in such a manner that the water shall not remain stagnant around its roots, which can easily be done, by first placing at the bottom of the space, where it is intended to set out the plant, some gravel, and over that a few inches of sand; and it is also advisable to put over the sand, the roots and vegetable substances which have been separated from the peat soil, when preparing it for filling the pots. The Camellia being thus set out, great care should be taken, to afford it a free circulation of air in the summer, and especially a humid atmosphere; and for this purpose, the sashes should be left open every pleasant night, to enable the plant to enjoy the refreshing dews, during that season; and it will also be beneficial to the plants, to renew the earth which surrounds their roots, every three or four years.

The Camellia placed in unconfined earth, without protection, is not capable of resisting, a temperature lower than from 38 to 41; consequently it would be a useless experiment, to attempt, in the climate of Paris, to expose it to a greater degree of cold. If the winter should be mild, it may be preserved, beyond a doubt, vegeetate well during the summer, and offer a beautiful appearance in autumn; but the frequent variations of the atmosphere, at that period, would cause the buds to fall off.

In warm climates, in a northern exposure, where it can be screened from the sun, and in a soil which is congenial, the Camellia

would become a magnificent tree, and present, at the time of its florescence an enchanting aspect. This prospect can be enjoyed at Caserta, near Naples, where there is cultivated, in the royal domains, a Camellia, which was planted in 1760. It is more than 40 feet high, and occupies, with its lateral branches, a space more than twenty feet in circumference. It is covered with thousands of blossoms n the spring, to which succeeds an abundant fructification, affording the means of infinite multiplication. We have often visited that admirable tree, and to perpetuate the recollection, we designed and colored it upon the spot, with all the exactness, which our feeble powers would allow. We presented the original painting to our master and honorable colleague, Mr De Candolle, the elder.

Section 12.—*Pruning of the Camellia.*

There are but few exotic plants, which bear pruning, as well as the Camellia; and by performing this operation with intelligence and at the proper time, it assumes the form, which it may be desired to give it, and blossoms most abundantly. The periods for pruning are, either the spring, immediately after the florescence, or in the summer, after the second growth; that is, about the middle of August. If the pruning is performed in the spring, it is necessary, immediately after that delicate operation, to carefully repot the shrub, place it in a green-house, where there is a considerable elevation of temperature, to induce it to throw out its new branches vigorously and in season to get well ripened before the cold weather commences. If the plants are pruned in August, it becomes requisite to sacrifice the existing buds, and a year is lost, before the blossoms can be enjoyed; for at this epoch the vegetation of the Camellia, is disposed to repose; but the after growth in the spring, which succeeds the pruning, will be much more vigorous, and the new branches with which the plant is supplied, will begin to bear buds the second year.

Besides, the Camellias which are pruned in August, may remain in the open air until the common period, when all the plants are returned to the green-house; but those which are pruned in the spring, require to be put in a glazed hot bed, immediately after that operation, as has been before said; for without this precaution, they vegetate but slowly, and produce only small and feeble shoots, which do not blossom for several years.

SECTION 13.— *The multiplication of the Camellia.*

The Camellia is multiplied in three manners: by the seeds, cuttings, or layers and grafts.

By seeds.— The seeds are planted, in a hot bed, under glass, in a peat soil, which has been passed through a sieve. The seeds which are sown, should have naturally arrived at maturity, which is easily known, by their falling spontaneously from their hard pericarps. The bed should be lightly covered with moss, to keep up, continually, a slight humidity. The seeds often remain two years before they vegetate, but sometimes the young plants appear the first year. As soon as the plants have attained about two inches in height, they are to be taken up, with a small ball of earth attached to each, and put into separate little pots, which are to be arranged in the same hot-bed, and protected from the air and sun, until they are in a state to bear exposure, when they are to be managed in the same manner as has been recommended for Camellias generally. At the expiration of five or six years, nearly all of these individuals, are in a flowering state; some of them, however, do not blossom for twelve years, as we have experienced. Seeds of the Camellia which were gathered in 1819, from the celebrated tree at Caserta, did not bloom until 1831, and we have two plants, which were produced from those seeds, that flowered for the first time in 1836, which was more than fifteen years after they were planted.

To induce Camellias, obtained from the seed, to bloom promptly, they must be grafted as soon as the wood is sufficiently matured, which is in their second or third year. This should be done only on the most vigorous plants, to render the florescence more certain and rapid.

By cuttings.—This method is employed to obtain free stalks, but more often to procure subjects for grafting; and the *single red* or *pink* are usually selected for this purpose.

The following is the most simple manner of performing the operation.

In the spring, the shoots, of the preceeding year's growth, are selected, from the single, or semi-double Camellias, which are divided into cuttings, from four to six inches in length; these are set out together a few lines distant from each other, in pots filled with peat soil, which are plunged in a pit of tanners' bark and covered with a

hand glass, or placed in a shaded position of the green-house; from time to time, it is necessary to raise the hand glasses, and wipe off the interior humidity, and occasionally moisten the cuttings, with a little watering pot, made expressly for the purpose. Cuttings thus managed take root, in about six weeks, and when the roots are sufficiently developed, they are transplanted into small pots, where they remain until large enough for being engrafted. The Camellia can thus be multiplied by cuttings, in green-houses, which have no artificial heat, and without the aid of tan; but the process is too long and often uncertain.

The Camellia can also be multiplied by layers; but horticulturists have generally renounced this mode of operation, because the subjects thus treated, take too long a time to root, occupy too much space in the green-house, or hot-beds, besides requiring the sacrifice of the most beautiful branches; and the result is not in proportion to the labor, time and expense, which it occasions; grafting, therefore, is the expedient of multiplication, which every where prevails.

Section 14.—*Different methods of grafting the Camellia.*

Grafting.—The Camellia, which it is desired to multiply, is generally grafted upon stocks of the *single red* variety, or any other single or double kind, may be selected, which can best be spared for that purpose. There are now several modes of grafting; but we shall only describe those which are most generally practised, and especially that, which the Belgians most commonly employ, to propagate the new and most valuable varieties.

Grafting by approach, or Inarching.— The kind of grafting most used, the easiest to perform, as well as the most natural and most ancient, is certainly that called inarching. This mode which can be practised at all seasons, is, nevertheless, most commonly performed in March.

In performing the operation, a lateral cut or slit is made in the stock, so as to form a kind of tongue, or a portion of the bark and sapwood is removed, an inch, or an inch and a half in length, and as low as possible. The same thing is done on the branch of the Camellia, which it is desired to obtain. The parts thus prepared are carefully united,— precaution being taken, that the barks of both exactly coincide, and they are confined with woollen yarn,

hemp, or strips of bass-wood bark, which have been first moistened. In a few months the parts are united; but the portion of the branch of the Camellia, which is united to the stock is gradually separated, by incisions made at intervals, of from eight to ten days, in the following monthly order. Camellias, inarched in March may be separated in August, and those on which the operation is performed in May, in October; being cautious to commence the incisions a month before.

Cleft Grafting.— This is the common mode of grafting, which every body understands, but which was not practised on the Camellia, until the immense results were made known, which our excellent friend, Mr De Soulange Bodin obtained, in his grand establishment at Fromont, near Ris. That learned and skilful horticulturist made use of this method, in preference to all others, because, at all seasons, it can be performed, by the aid of the artificial means which is specially used, to excite a flow of sap in the plants, and cause them to vegetate. Mr Soulange Bodin has substituted this kind of grafting for that of Belgium,— an account of which we shall give hereafter; it offers the same advantages, namely, economy of time and material, and probably more certainty in the results. By the employment of this ingenious method, a small twig of the species, which it is desired to multiply, having on it a single bud, and grafted on a congenial stock, produces, in six weeks, a complete shrub.

Mr Soulange Bodin calls this the *stifled* graft, because the plants, as soon as they are grafted, are put in a very warm bark-pit and covered with a bell-glass, where they have the appearance of being stifled.

Those who say, that this mode of operating, injures the root of the stock, while it is subjected to the very elevated heat of the hot bed, are completely deceived. We have had, in our possession, many Camellias, which were grafted in this manner several years since, and we have never perceived any disease in them which could have arisen from that cause. We will cite a characteristic fact, in support of this assertion. In January 1830, having made an excursion to Fromont, we selected and brought back, during intensely cold weather, against the advice of the proprietor, and the gardener of that establishment, a dozen little Camellias, which had been grafted according to the above named process, and recently

removed from the hot bed. In spite of all our precautions, we found the earth in the pots entirely congealed on our arrival. Still hoping to save them, notwithstanding this fatal accident, which was solely occasioned by our obstinacy, they were carefully kept, the whole of the winter, in a mild and uniform temperature, and in the spring, we had the pleasure of seeing the whole of our Camellias vegetate vigorously, as if nothing had happened. If the manner in which my friend had treated these young plants, had been pernicious and injured their roots, and especially when the severe cold to which they were subjected was added to that cause, they must inevitably have perished, without the possibility of redemption.

The Belgic Graft.— This is a lateral mode of grafting, to which the Belgians give the preference, and is performed from spring until autumn. This is the method of operation. A portion of the bark and wood is cut from the side of the stock, and as low as possible, in the same manner as for inarching. A small scion of one or two inches in length, with one bud and a single leaf on it, is taken from the Camellia, intended to be multiplied, the end cut sloping, on one side only, like a wedge and so placed on the stock, as that the barks of both shall coincide, and then secured with woollen yarn.

When this operation is completed, the pot containing the engrafted stock, is placed upon its side upon an unheated bark-pit, or dry moss, on which, however, the branches only should rest; then the grafted part is immediately, hermetically covered, with a bell-glass. At the expiration of fifteen days, the graft is perfectly united, and in three weeks, at the farthest, the plant is ready for sale.

It is superfluous to remark, that this graft, during the whole time that it remains under the bell-glass, to form the desired union, should always have the protection of a green-house, if the operation is performed in the summer, and of a glazed but unheated pit, if at any other season.

Inarching — by a cutting.— Heretofore, in uniting the graft to the stock, it was planted like a cutting, near the root of the stock, and a result was produced, very nearly like that which is obtained by the Belgic graft; but this mode of operating, requiring a branch of a certain length, the same number of plants cannot be obtained from the parent Camellia; but still, this mode, as well as that of the Belgians, is economical and expeditious.

ART. II. — *The Cultivation of Truffles, or Instruction for artificially raising and making large Plantations of Black and White Truffles, in Woods, Shrubberies, and Gardens.* By ALEXANDER VON BORNHOLZ.

Introduction.— Ripe truffles, freshly taken up are more different from those that are dried, dipped in oil, wrapped in waxed paper, or preserved in glasses, which the Italians and French sell us for German gold, than a beautiful Borsdorfer apple is from slices of a dried apple. Neverthless the best in the woods of Germany are not dug up, and not unfrequently, either from ignorance or the avarice of those that deal in them, bad and useless sorts (such as the swine-truffle) are mixed along with the edible ones. Every admirer of truffles (and who is not such, when he has once tasted perfectly ripe ones?) will rejoice to learn that they may be, and have been, raised upon situations adapted to them, as well as mushrooms; and that the planting of them is neither expensive nor troublesome. Every one who has a proper situation for them on his estate, will most willingly make plantations of them according to the directions here given. At a small expense, he will augment at once the pleasures of his table, and also his income; for in a few years the crops will have so increased, as to enable the planter to offer them for sale. He will then not only receive back his first expenses, but also a considerable surplus. There is no reason to apprehend that truffles will, by means of numerous plantations of them, sink in value (as almost all productions of landed property have done,) so as to be hardly worth any thing; since most of those who buy truffles dwell in large towns, and are so engaged as to have no time to raise them. On the contrary, by the extension of the cultivation of truffles, the money now paid for them to foreigners would be spared to our country, at which every sincere lover of it would rejoice; and the consumption of the article would probably be very greatly increased. We may confidently expect an active participation in extending the cultivation of truffles, from the exertions of our horticultural societies. By this extension, not only will the profit of land be increased, but also the pleasures of society, as these are more promoted by delicacies for the table than by the rarest flowers.

Among the various species of fungi which man has applied to his

nutriment, the truffle is of the greatest value. Morels are much inferior to it. Even the highly esteemed cultivated mushroom is not to be compared with it, still less are other edible fungi. With connoisseurs it is in higher estimation than the pine-apple amongst fruits, and oysters amongst bivalves. The high estimation in which truffles are held, and their dearness, are not however occasioned by their peculiarly fine aromatic flavour alone, but by the difficulties which are connected with seeking them in woody situations. Dogs must be broken in, or swine must be accustomed to discover and turn them up; and only a few people understand the art of accustoming these animals to resist their natural voracity, and to leave to man the food they have discovered.

On this account, the truffle in Germany, appears only upon the tables of the wealthy, and of those who have large landed possessions; in which they seldom cause truffles to be sought for, but buy them at a high price from foreigners. Truffles grow in several woods; but people avoid the trouble of either digging them up, or of training dogs and swine, to enable them with facility to take them out of the earth. German truffles are left as food for worms and for swine, and people are satisfied with such as the industrious French or Italians have sought out in their own country, and have sent abroad as merchandise.

As truffles are produced in woods, the proprietors of woods are the only persons that are entitled to cause them to be dug out. Only a few proprietors of extensive landed property or of large gardens possess woods, or, even if they have such, the soil of the wood does not possess such a mixture of earths as this species of fungus requires for its production and growth. It cannot therefore be produced, and the proprietor of landed property is compelled to purchase fresh truffles elsewhere; or, since they grow only in few places, and are generally sold to favorites, must accommodate himself with such bad ones as are offered for sale.

The relish of the truffle arises from very fine matter, which is so volatile that it rises through the strata of earth, and betrays at the surface the deeply hidden fungus to certain animals endowed with an acute sense of smelling. In order to preserve this volatile matter from escaping, those truffles which are intended for sale by the French and Italians are preserved or marinated, enclosed in glasses from which the air is excluded, or dipped in oil, and then wrapped

up in waxed paper. Notwithstanding all these contrivances, this valuable matter cannot be completely retained; and the bought truffles are as much inferior to fresh ones that have been lately dug up, as asparagus pickled or dried for winter consumption, or the beans and peas preserved in the same way, are to the same fresh vegetables cooked in spring and summer.

It must be very desirable to every proprietor of lands and gardens to become acquainted with a practice by which he can raise truffles himself. By such means the pleasures of the table will be enhanced, or, if he should prefer it, the profit of his landed property will be increased by the sale of fresh truffles. It is long ago that the great advantages which such cultivation would produce have been perceived; and in the last century many attempts were made, although fruitlessly, to transplant and cultivate truffles. How, indeed, could it have been possible to transplant, with the requisite skill, a fungus, the nature of which was totally unknown, and the circumstances under which it was possible for it to arise and thrive were not attended to?

Whether truffles, as fungi in general, should be ranked amongst plants or animals, was a disputed point; but now the conviction is, that they belong exclusively to neither, but stand in the midst between the two kingdoms, and incline equally to both. They are not propagated by seeds, as was formerly believed; but are formed in the upper strata of the earth, as hydatids in animal bodies, or the infusoria, visible only to the eye that is assisted by a microscope, in water that contains organic matter. Since no man either has seen, or can see, the seed of fungi, it was assumed to be so small as not to be visible even by the assistance of the best microscope. This seed, then, must have filled the air, and laid hold of every small place which made the germination and increase of the young plant possible. Such a supposition was admissible in the case of those fungi that grew in the open air, but impossible with regard to those which were found in the earth. How, in this case, should the fine seed escape out of its closed grave, drawn forth by the attracting powers of the soil, and be carried to distant places to produce in them new truffles?

The error, however, was the occasion of trials, which, being founded upon a wrong supposition, could not be attended by a successful result. In order to cultivate mushrooms and truffles, old

fungi were dug up, and planted in the places destined for them, to shed their seed, and be the origin of a new race of fungi. Peculiar care was bestowed upon truffles: they were cautiously dug up from their ancient place of growth, and taken to the new soil, which, however, was neither properly prepared, nor the mixture of earths given to it which was requisite to the prosperity of the fungus. It then appeared to be inconceivable, why, with all this attention, the experiment failed; and the old truffle soon died, without leaving any successors. It was expected to scatter seed in the soil, but had disappeared without leaving a trace behind it. Was the proceeding here observed at all different from cutting a hydatid out of one animal, and inserting it into another? or causing an intestinal worm to be swallowed, and then imagining that the minute animal should be increased in its new situation?

The hydatid and intestinal worm are not produced by transfer, but by such changes taking place in the mixture of the component parts of the animal bodies in which we find them, as to occasion that species of worms to be produced and thrive. We sometimes find newly born, and even unborn, animals inhabited by worms, which, nevertheless, are not transferable. Other animals, on the contrary, are free from worms to the extreme of old age; for their bodies present not to these worms such a habitation as is requisite to their thriving. Just in the same manner fungi, viz. mushrooms and truffles, which are very obstinate in their choice of situations (habitats,) arise and thrive only under favorable circumstances, in a soil suitable to their nature.

Many attempts failed before it was known how to raise mushrooms upon places where they were wanted, and yet this fungus is not near so delicate in its choice of a habitat and mixture of soil as the truffle, whose artificial increase was not successful. The secret of raising the mushroom upon places that were assigned to it, was only comparatively recently discovered in Italy. Without being able to give any exact account of the grounds upon which the experiments were made, the object in view was obtained by means of several experiments. The preparations that were made, and in general, the whole procedure, were imitated in France, and succeeded. The raising of truffles would be still easier in Germany; since here the proceeding might be commenced with proper views of the nature

of the fungus, and of its manner of originating and formation: its proper treatment could, therefore, be easily pointed out.

There are several kinds of truffles, which must be critically known and distinguished by any one who proposes to lay out a situation for this species of fungus. Without this, the planter would be exposed to the hazard of planting bad and useless kinds, instead of the good and eatable ones. To enable him to avoid this, the following description of the different kinds will be useful to most readers :—

Linnæus and other ancient botanists comprehended all the different species of truffles under the genus Lycopèrdon, which is said to be distinguished from the rest of the fungi by having a round body filled with powdery seeds. The lycoperdons have, while alive, a fleshy body, with veins running through it, which, by means of absorbing organs, like roots, either draw their necessary nutriment from the earth, or sit upon plants and rob them of their juices. For example, to the first division belongs the commonly known puff ball (Lycopèrdon *Bovìsta;*) and to the last, the grated puff ball (Lycoperdon cancellátum,) upon the leaves of the pear tree. When dead, the inside of the body, of most kinds, quickly becomes an extremely fine dust, which, for a considerable time, is included in the dry, more durable, paper-like external skin. Formerly, in this fine dust the seed was looked for; and it was supposed to be carried by the winds into very distant districts. This belief was so strong, that it could not be shaken by all the unsuccessful attempts which were made to raise young fungi by sowing the supposed seed.

Later botanists have separated the family of such lycoperdons as grow within the earth from the two other kinds which grow upon its surface, and have raised them to a separate genus, under the name Túber. The latter differs much more from the former, than the cherry does from the plum, or the bean from the pea. The new genus includes many species, though not all of them; especially those which grow in deeper strata of earth are sufficiently known to be distinctly different. The following are the only ones that are accurately known :—

1. *The true truffle* (T*úber gulònum*, T. *gulosòrum*, *Lycopérdon* T*úber* L. T*uber cibarium*, Sibth.)—Of a round form, more or less approaching to that of a sphere, or of an egg, or sometimes kidney-shaped, and somewhat rough with protuberances. The color of the

surface is, when it is young, whitish; but in those that are full grown, it is either blackish, or a deep black. The color of the inside is whitish, with dark blue and white, grey, reddish, light brown, or dark brown veins, of the thickness of a horse-hair, which are usually variously entangled, and which form a kind of network, or mat. Between the veins are numerous cavities, filled with a great deal of mucilage and small solid grains. These scarcely visible glands were formerly said to be the seeds or germs of the young truffles. The less the inside of the truffle is colored by dark veins, the more tender and delicious is its flesh. The blackish external rind is hard, and very rough, by means of fine fissures, grains, and protuberances; and forms, with its small facets, which are almost hexagonal, an appearance by which it somewhat resembles the fir-apples of the larch.

Whilst the truffle is young, its smell resembles that of putrid plants, or of moist vegetable earth. When it first approaches the point of time at which it has attained its full growth, it diffuses an agreeable smell which is peculiar to it, resembling that of musk, but which lasts only a few days: it then becomes stronger, and the nearer the fungus is to its death and its dissolution, which speedily ensues, so much the more unpleasant and urinous is the smell, till at last it is quite disagreeable and putrid. Whilst young the flesh is watery, and its taste insipid: when fully formed, its firm flesh, which is like the kernel of the almond and the nut, has an extremely aromatic and delicious taste; but as soon as the fungus begins to decay, and worms and putrescence to attack it, its taste is bitter and disagreeable.

Wherever truffles are produced, there they are to be found the whole year through, from the beginning of spring till late in autumn; but in the greatest plenty from towards the end of the month of August to the latter end of October. They thrive extremely, like all fungi, in warm moist autumns, and are then most delicious. After warm continuing showers, they are found nearer the surface of the soil, sometimes so high that they form little hemispherical mounds of earth, in which small clefts are produced by the sun's rays. If the soil is loose, and dry weather succeeds, the earth which was raised up falls down, and the truffle is seen half uncovered. Nevertheless, these truffles are of small value, as they are generally either dead or worm-eaten.

The favorite habitat of truffles is a somewhat moist light wood

soil, which is defended from the immediate effect of the burning rays of the sun by large oak trees, standing at a distance from each other, but is not deprived, by thick bushes, of the free access of currents of air. Where, in woods, there are places bare of timber trees, and with but few bushes, or covered with pollarded wood that does not stand thick, they thrive under an oak, beech, whitethorn, and even under a fruit tree, and sometimes attain the weight of from a pound to a pound and a half: this unusual size, however, is only met with in moist warm grounds. Here they lie nearer the surface of the soil. The drier the soil is, the deeper they are produced in it; but are usually so much the smaller: to this the vicinity of springs is the sole exception.

There are some varieties of truffles which differ in the greater or less degree of roughness of their external rind, in a stronger smell, resembling that of garlic, and in a lighter or darker color. Amongst all truffles, the white variety is of most value, and is preferred to every other. It grows in Upper Italy, chiefly in Piedmont. Its surface is of a yellowish brown, or pale grey-yellow, covered with protuberances resembling warts. The veins in the inside are more delicate than in the black kind, and are of a reddish yellow color. Between the veins, the flesh of truffles that are fully formed, and their sap-vessels and glands, are of a reddish color. The smell and taste of the white truffle are much superior to those of the black, and on that account it is more deserving of cultivation. Only the first plantation requires to be circumstantially attended to, as living pieces can seldom be procured, and to plant dead ones in new plantations is useless. Since this white truffle never degenerates to the black, but constantly produces the same, it appears to be not a variety, but a particular species. It is also found in vineyards, meadows, and even ploughed fields; but the black ones are found only near to forest trees.

2. *Hog-truffle, Swine Truffle, Wild Truffle* (*Túber suìllum.*)—This truffle, which is generally kidney-shaped, usually reaches the size of a bean, and only under very favorable circumstances that of a small hen's egg. It has a thin, leather-like rind, which is covered with many small round warts, without any flat interstices. By means of these, it is distinguished from the true truffle, which sometimes also assumes the kidney shape. The flesh is juicy, and traversed by coarse veins, which are not very crooked. The smell is dis-

agreeably sour, and is like that of swine's dung, on which account it has received its name. Its taste is unpleasant and insipid. On account of its disagreeable taste and smell, it is not used as food; and none but avaricious truffle-hunters mix it amongst the edible truffles, along with which it is often found. There are, nevertheless, districts in which none but swine-truffles are to be met with. Being hardier than the real truffles, they can easily give such properties to the soil of woods, that it produces none but swine-truffles. They are usually found in abundance in such tracts of land as are not mellow, but incline to sourness. Young plantations of truffles may easily be spoilt, and all labor and expense be useless, if, through inattention or want of knowledge, this swine truffle is transferred from its old place of growth into the new. As the real truffle prefers the oak, so the swine truffle seems to prefer the whitethorn, to all other trees. Under its roots they are formed from twenty to thirty together; on the contrary, the edible truffle seldom occurs so many together; it usually lives singly.

3. *Small Truffle* (*Tùber mínimum.*)—This species of truffle lives in much society, and always occurs in great numbers together. It attains only the size of a pea, and is of an irregular form approaching that of a sphere. Formerly it was thought to be the young progeny of the edible truffle.

4. *The Stag-truffle* (*the Stag-rut Fungus*, *Tùber cervínum.*)—This is the largest kind. It has a globular form and a loose spongy flesh, which, in the midst of its body has so little coherence, that it forms a dusty core or heart. It is not used by man, but red deer scrape it.

All truffles draw nourishment from the earth; not by means of roots, of which no trace is to be found, but by absorbing vessels which cover their whole superficies, in the form, generally, of small warts. For this reason they can thrive in none but moist situations, which offer them, in sufficient quantity, matter dissolved in water. In proportion as the earth about them dries up, the fungi must wither away. They have indeed, in their interior, vessels which contain water, to enable them for a time to do without external moisture; but, if the drought continues, their internal provision is exhausted, the truffle becomes unhealthy, and must at length perish from thirst.

Notwithstanding the want of moisture is thus injurious to the cul-

tivation of truffles, too great a quantity is equally destructive to them. Acids are generated, mould and numerous other parasitic plants get a footing upon the surface of the tubes, and by degrees obstruct the absorbing vessels, and the body of the truffle is consumed or putrefies; the mould also allures many small worms which establish themselves upon the truffle and live upon its flesh.

Upon the first production of the truffle its size is scarcely perceivable; as it proceeds in its growth, the earth that is around it is pressed together and pushed off. On this account the truffle can prosper in none but a loose soil. If the soil is every where equally loose, the truffle assumes a globulur form; but this is changed if there is on one side a greater opposition than on the other; as, for instance, by a root or stone. Hence the different forms of the tubers may be explained. Where the soil is most moist, whether above or under the truffle, there it will either rise up or sink deeper. The degree of power of attraction of the moisture in the earth, to that in the truffle, necessitates such a change of place. In moist summers, and in wet winters, we find the truffles near the surface, even projecting above it. In dry summers, upon poor dry places in woods, they have often to be dug from a depth of more than a half a foot. Here is imposed upon them a greater pressure of superincumbent soil. If the earth is not very light, they cannot be fully developed, and therefore remain small. The largest are, consequently, in general, found not deep under the earth, and in shaded light soil that is somewhat moist; they are not, however, so well tasted as those of middling size; they are also usually injured, and therefore of a bitter taste. The access of their enemies, viz. worms, snails, and quadrupeds, is much facilitated when no deep stratum of earth protects them against these attacks.

As truffles were found in such soils only as contained many putrid parts of vegetables, especially roots and leaves, or twigs of trees; it was in old times the opinion, that these fungi were neither plants nor animals, that they did not arise from germs, but that they had been formed by a globular secretion and attraction of matter found in the earth. According to this supposition, they no further differ from minerals than that in them the materials of the earth unite in forming a new substance; but here, in the case of truffles, the new body is formed by parts of plants in solution. Pliny, the Roman naturalist, was of the same opinion, and adduces as a proof, the ex-

perience of a Roman prætor, Lartius Licinius. This person, a few years before, had eaten truffles in Spain, and had met with something hard in one of them. Upon a closer examination he found a small Roman silver coin, a penny (denarius ;) which, therefore, being accidentally present in the mechanical accretion of its component parts, was enclosed along with them Taking the fact for granted, it by no means proves the assumed opinion. If the coin were really found in the body of the truffle, and had not in the cooking accidentally found its way in, it had been pressed in by the quick growth of the fungus. Being a hard body, it did not give way to the truffle equally with the loose moist soil, and was included in the substance of the fungus, as nowadays small foreign bodies, such as stone and metals, are met with in wood, and in the inside of more juicy plants. When such are met with, they are supposed to have been accidently included ; because it is known that a tree or plant continually increases in circumference from its youth to its old age. There is no reason in these instances, from the presence of these foreign bodies in wood, to infer a mechanical accretion of component parts, and there is as little for the inference in the case of the truffle. This, nevertheless, is still believed by individuals, who pretend that all fungi are formed from the putrescence of dead vegetables.

There is, however, some truth in this clumsy representation. As the infusoria are more readily produced, and in greater numbers, in water that contains a solution of organized matter, so fungi are produced where the soil is mixed with such matter as must necessarily be used for their formation. When truffles are to be produced by artificial means, nature must be imitated as closely as possible, and such circumstances introduced as are always met with in the habitats of this fungus.

(To be continued.)

Art. III. — *Premiums of the Massachusetts Horticultural Society.*

The Massachusetts Horticultural Society, established in Boston, offers the following premiums, for Fruits, Vegetables, and Flowers, for 1838.

The augmented and various displays of Flowers, Fruits, and Vegetables, and the zeal manifested by the cultivators thereof, during the past year, have been such as to induce the Massachusetts Horticultural Society, to offer, for the present season, the following premiums, to promote the general interest of Horticulture, and to excite a spirit of emulation among its members for the public good.

FRUITS.

Pears.	For the best Summer Pears, not less than one doz., a premium of	$5 00
	For the best Autumn Pears, not less than one doz., a premium of	5 00
	For the best Winter Pears, not less than one doz., a premium of	5 00
Apples.	For the best Summer Apples, not less than one doz., a premium of	5 00
	For the best Autumn Apples, not less than one doz., a premium of	5 00
	For the best Winter Apples, not less than one doz., a premium of	5 00
Cherries.	For the best Cherries, not less than two quarts, a premium of	5 00
Peaches.	For the best Peaches, open culture, not less than one doz., a premium of	5 00
	For the best peaches, under glass, not less than one doz., a premium of	5 00
Plums.	For the best Plums, not less than one quart, a premium of	5 00
Apricots.	For the best Apricots, not less than one doz., a premium of	4 00
Nectarines.	For the best Nectarines, not less than one doz., a premium of	4 00

Quinces.	For the best Quinces, not less than one doz., a premium of	5 00
Grapes.	For the best Foreign Grapes grown under glass, a premium of	10 00
	For the best Foreign Grapes, out door culture, a premium of	5 00
	For the best Native Grapes, a premium of	5 00
Gooseberries.	For the best Dessert Gooseberries, not less than two quarts, a premium of	5 00
Raspberries.	For the best Raspberries, not less than two quarts, a premium of	5 00
Strawberries.	For the best Strawberries, not less than one quart, a premium of	5 00
Currants.	For the best Currants, not less than one quart, a premium of	2 00

VEGETABLES.

Asparagus.	Earliest and best in open ground,	$4 00
Cucumbers.	Best pair on or before the 1st Saturday in July,	4 00
Cabbages.	Early, the best four heads,	2 00
Carrots.	Twelve roots, the earliest and best,	2 00
Beets.	Twelve roots of the earliest and best, by the 1st Saturday in July,	2 00
Rhubarb.	Six spears of the best,	3 00
Potatoes.	Early, one peck the best, by the 1st Saturday in July,	3 00
Celery.	Two plants, earliest and best,	2 00
Beans.	Large Lima, two quarts shelled,	3 00
"	The earliest and best, dwarf shell, two quarts,	2 00
Lettuce.	Four heads, the finest and heaviest of the season,	2 00
Cauliflowers.	Two heads, the finest and heaviest of the season,	3 00
Broccoli.	Two heads,	3 00
Squashes.	Winter, the largest and best pair,	3 00
Peas.	One peck, the earliest and best, by the first Saturday of June,	4 00
Melons.	Water, the largest and best pair,	3 00
"	The finest greenflesh in the season,	3 00

Indian Corn, for boiling; twelve ears, having regard to the size of the ears, their earliness, and the quality of the corn, 2 00

FLOWERS.

Roses.	For the best display,		$5 00
	" 24 hardy varieties,		3 00
	" 12 " "		2 00
	" 12 China and other tender varieties,		3 00
Hyacinths.	Best display,		5 00
Carnations.	" "		5 00
	" six varieties,		3 00
	" seedling,		3 00
Pinks.	" display,		5 00
	" six varieties,		3 00
	" seedling,		3 00
Tulips.	" 12 varieties,		8 00
Dahlias.	" display,	1st prize,	10 00
	" "	2nd "	6 00
	" 24 varieties,	1st "	8 00
	" "	2nd "	5 00
	" 16 "	1st "	6 00
	" "	2nd "	4 00
	" 8 "	1st "	5 00
	" "	2nd "	2 00
	" seedling,	1st "	3 00
	" "	2nd "	2 00
Violas.	" display,		5 00
	" seedling,		3 00
Geraniums.	" display, six varieties in pots,		5 00
	" seedling,		3 00
Herbaceous Plants.	Best general display during the season,		10 00

A gratuity is also offered for any specimens of new or rare plants, or for any plant, which may be considered by the Committee on Flowers, deserving, for its great beauty or superior culture, such mark of approbation.

It is desirable that the specimens offered for competition should

be as numerous as possible, regard being had that none should be presented but those of a fine quality, and that each kind should be accompanied by its name.

The society may withhold any prize if the specimen exhibited be deemed, by them, unworthy; although a prize may have been announced for the best production in the class to which it respectively belongs. And be it further understood, that all Fruits, Flowers, or Vegetables, brought forward for competition, must be the property of, and raised by the competitor.

The Society meet every Saturday morning at their rooms, 23 Tremont Row, where articles designed for exhibition or competition may be presented. The specimens for premiums should be on the table by ten o'clock, A. M. labelled with the name of the owners. Persons wishing to become members of this Society, will please make application to any of the officers as above.

All premiums not applied for within six months after they are awarded, will be considered as forfeited to, and for the use of the Society.

Committee on Fruits.

W. Kenrick, *Chairman*,
Robert Manning,
Samuel Downer,
Benj. V. French,
Edward M. Richards,
John A. Kenrick,
John M. Ives, Salem,
P. B. Hovey,
L. P. Grosvenor,
William H. Cowen,
J. L. L. F. Warren,
S. Pond.

Committee on Vegetables.

Samuel Pond, *Chairman*,
P. B. Hovey,
S. Walker,
E. M. Richards,
Aaron D. Williams,
Rufus Howe.

Committee on Flowers.

S. Walker, *Chairman*,
C. M. Hovey,
Joseph Breck,
S. Sweetseer,
D. Haggerston,
Samuel R. Johnson,
M. P. Wilder,
William Carter.

E. VOSE, *President.*

R. T. PAINE, *Corresponding Secretary.*

Art. IV. — *The Kitchen Garden.*

General Observations.—The Kitchen Garden may be considered as the most useful department in Horticulture; its adaptation being wholly for the produce of esculent vegetables, and fruits.

The leading features of a Kitchen Garden are, in regard to its selection, that it be so situated as to be inclined to a S. E. direction, and protected on the N. W. with a high boarded fence, or brick wall from 12 to 15 feet high, in order to shelter it from the cold winds, &c. The soil should be of a deep rich, mellow loam, of an even surface. Water will also be a consideration, and should, if possible, be conducted into the Garden, or at least contiguous thereto.

In laying a Kitchen Garden out, it should be done in the most simple manner, both for convenience, and a correspondence of its utility. The most approved method is to have the garden so situated as to be in a square with the four points of the compass, viz: N. S. E. W., surrounded with either a boarded fence or brick wall. The ground will require to be divided into four or six squares, according to its size, if no more than an acre or two, four will be sufficient; if larger, six will be requisite.

The walks will require to be eight or twelve feet wide, according to the extent of the ground, but eight feet at the least, which will be in parallel lines with the four points or quarters. The ground must now again be divided round the outside by making a walk entirely round the ground of the same width and nature as the centre walks, leaving a border twelve feet wide round the whole of the garden. In laying out the garden it will require to be managed with all possible economy; in regard to preparing the different departments for the various vegetables that are intended to be grown. The first object is to stake out the walks, when the earth is to be taken out to some convenient depth from six to twelve inches, which is to be taken on the squares or borders, where it is the most wanted; the walks are then to be filled with gravel and made. In preparing the ground, it should, if convenient, be made of a different component and quality in order to accommodate the different vegetables, at different seasons, namely: the South and East borders should be made of a light rich soil, for early vegetables; the North

and West borders should be of a moist mellow loam, to contain a moist quality for the accommodation of summer vegetables in the hot months. The selection of fruits should be of the best quality, and such as are known to bear well, and give a regular succession. The vegetables should be of the truest varieties of their kinds; and of such varieties as are known to be wanted in every department of the kitchen concerns.

The manner of planting should be of a regular mode, beginning always at the south part of the garden; as the south borders, &c., and the squares and western borders may be next cropped and so on in proportion, till the north situations are brought into cropping, which will be in the hot months if well managed. The fruit departments, such as currants, gooseberries and the like, should occupy a department entirely by themselves. The planting of fruit in the borders of a kitchen garden is always attended with bad consequences. The seed beds as onions, beets, parsnips, carrots, &c. should be planted in a square purposely prepared by working it deep and well manuring, as most spindle shaped plants or roots, require a deep rich soil. Such beds should be so managed as to be cropped *alternately*, the beets should be succeeded by carrots, parsneps by onions, &c. Large perennial plants, as the pie-rhubarb, sea-kale, artichokes, asparagus and the like, will require a separate square. Herbs, as mint, thyme, &c. may be planted on a western border, or at least in a separate department.

A considerable number of forcing frames may also be attached to the kitchen garden, which may be considered of great utility in the first case by forcing vegetables, in the second case by preparing the manure by a process of fermentation, and in the third by all noxious seeds being destroyed by being fermented, hence great expense is saved in weeding. No kitchen garden of any respectability, should not be without a good quantity of forcing frames. The last and great object should be to keep the kitchen garden free and clean from weeds, or any nuisance that may tend to encourage vermine, or that may be offensive to the eyes.

Succession of Vegetables.— In the management of the kitchen garden it will be necessary to point out first, some of the principal requisites, of which, the knowledge of the proper vegetables, must most certainly be the prime consideration, which will be found in the list of esculent vegetables with their time of planting, and proper

season for table. The second essential consideration, is the obtaining a regular succession of such vegetables, as may be required for many months, and others perpetually, as the onion, carrots, &c. To obtain a succession of vegetables the first grand object is to make every preparation in the early part of the season in order to forward vegetables of every description at an early period. This must be done partly by growing the seedling plants, as cabbage, lettuce, &c. in frames in the fall, which will require to be protected through the winter, and partly by well preparing the frames for their reception by pulverizing, manuring, &c. Another object is also to be kept in view, namely, *the most careful and attentive treatment.*

The removal of vegetables from frames or other places where they have been forwarded, to be planted in the open ground, may be considered as a sort of mitigation from an unnatural to a natural soil and situation, consequently great care must be taken that the change is not sudden which will retard instead of forwarding their growth. In the first place great care should be taken in the act of transplanting not to injure the roots, which will be unusually *tender*, by the process that has been taken.

Secondly.— Every attention must be paid in protecting and covering, to keep them secure from the cold external air, frosts, colds, winds, and other causualties, every attention will be required also as regards culture, as working well about the roots of such plants and warming the soil in order to stimulate their growth, in this early season.

The next consideration is early cropping in the natural way to succeed those raised in hot beds and other artificial means; this must be managed by cropping the warm part of the garden, as the south borders and the most highly cultivated parts, with such vegetables as will be required to succeed those already planted. E. S.

(To be continued.)

Art. V.—*Miscellaneous Matters.*

Walker's Tulip Show.—Mr S. Walker of Roxbury has again exhibited his bed of fine Tulips; and we are gratified to learn has received increased patronage. For ten days past his tulip house has been thronged with delighted visitors. Fortytwo new varieties have been added since last year. It is undoubtedly the best collection in the country. The Tulips had a fine healthy appearance, and are evidently superior to what they were at the last exhibition. So rich and gay an assemblage of plants we do not recollect of having ever seen before. The bed contains 700 bulbs in 100 rows, seven in a row, the rows seven inches apart, and seven inches from each other in the row, making the bed about 60 feet by 4. The Tulips are well arranged as to color and height; the tallest being in the centre of the bed and the lowest growing sorts on the outside. We cannot attempt to describe the endless variety and beauty contained in this bed. To have any idea of its splendor it is necessary to be an eye witness; language and even the pencil would fail in the attempt.

The Strawberry.—The season approaches, when the strawberry will be in bloom, and it is vain to expect success in the cultivation of this fruit, without understanding the character of the plant. It belongs to the class of plants that have the male and female organs in the same plant and in the same blossom. Yet in all the kinds I am acquainted with, with two exceptions (the white and the monthly) the male organs are defective in one set of plants, and the female in another, and in some of the largest varieties, it amounts to a complete separation of the sexes. In some of the varieties, a single plant of either may produce a few berries, but they will generally be half formed fruit. Both kinds, are produced from the seed, and after bearing for years, they never change their character. One barren vine, is necessary to every ten or twelve bearing ones. The barren vines require watching for they will form ten new plants, where the bearing form one An experienced eye can tell them apart, at any season. They may be distinguished at the distance of ten feet, when in bloom. The male blossom, is nearly double the size of the female. In the female blossom, the male organ can only be seen on dissecting the blossom, and bringing it near

the eye. In the male, they can be seen with their yellow and their brown heads, at the distance of ten feet, hiding the female organs. The principle holds good, in all the wild strawberries I have met with, in different parts of the Union. On dissecting the blossom, the female organs will be found attached to the stem; the male, to the hull. Examine your beds when they have been in blossom a few days, and you will find the female blossoms have fruit fully formed, the male none, or very scattering. With proper attention more fruit may be raised on one hundred feet square, than by chance culture can be raised on an acre. In setting out a plantation, a person by chance may obtain both male and female plants and have a good crop. But if suffered to run, in three years, the male plants would extirpate the females. Vines must not stand too thick, or the fruit will be smothered, and never come to perfection. —*Cincinnati Express.* N. LONGWORTH.

THE BOTANIC GARDEN.—A meeting of the subscribers to the Botanic Garden, to be established by consent of the city on the vacant lands west of Charles Street, fronting the common, was held on Saturday afternoon, June third, and the subscription lists bearing a sufficient number of names and amount of money to warrant the immediate commencement of operations, the subscribers adopted a Constitution, and proceeded to the election of Five Trustees to represent them until the first Monday in October next, which was appointed as the day of annual meeting. The following gentlemen were chosen: HORACE GRAY, SAMUEL A. ELIOT, C. P. CURTIS, GEORGE DARRACOTT, J. E. TESCHEMACHER.

The amount already subscribed, is nearly $20,000. From the spirit manifested at the meeting, we feel confident that before the close of the season a commencement will have been made, and an exhibition of choice flowers presented to our citizens that shall delight and astonish them. The subscription lists are still open, and the advantage, to the subscriber of $100, to the corporate property, is the free admission of himself and household to the Gardens at any time during the hours that they are open. A barren waste will soon be converted into a delightful promenade—a paradise in miniature.—*Transcript.*

QUINCY MARKET.

[Reported for the Horticultural Register.]

ASPARAGUS,	per bunch,		10
APPLES, Russet,	bushel,	1 25 a	1 50
Baldwins,	none.		
Dried,	pound,		8
BEANS, White, Foreign,	bushel,	1 50 a	1 75
Domestic,	do.		2 25
BEETS,	do.		75
BROCCOLI,	head,		25
CARROTS,	bushel,		75
CAULIFLOWER,	head,		25
CRANBERRIES,	bushel,		3 00
CUCUMBERS,	pair,	50 a	1 00
DANDELIONS,	peck		12
HORSE RADISH,	pound,		8
LEMONS,	box 2 25 a 2 50	dozen 17 a	25
LETTUCE,	head		3
ORANGES,	box 2 25 a 2 50	dozen 17 a	25
ONIONS,	bushel,		2 00
new,	bunch,		6
PARSNIPS,	bushel,		75
PARSLEY,	half peck,		25
POTATOES,	bushel,		50
RADISHES,	bunch,		3
RHUBARB,	pound,		3
RUTA BAGA,	bushel,		75
SPINACH,	peck,		12
SQUASHES,	pound,		3
TURNIPS,	bushel,		75
WALNUTS,	do.		2 00

Apples, with the exception of Russets, are scarce and hardly to be found.—Beets, Carrots, Parsnips, and Onions are mostly out of market, and with the exception of Onions, no new ones have appeared.

We have noticed a few Cauliflowers and Broccoli from the garden of J. L L. F. Warren, of Brighton, the first which have been offered for sale this season. With Radishes, Lettuce, Rhubarb and Greens of various sorts the market appears to be well supplied.

Forced Cucumbers come in in sufficient quantities to supply the demand at prices quoted.

Boston, June 4, 1838.